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U. S. CLUB, SIMLA.

Simla, the 8th July 1943.

To

THE SECRETARY, DEFENCE DEPARTMENT,
NEW DELHI.

SIR,

As orally instructed, I have the honour to submit a preliminary report on the results of my touring to date in consequence of orders given me on January the 14th.

2. As will be seen, a separate chapter has been given to each Government visited. A copy of the relevant chapter, in draft, was sent to each Government, and the case as now submitted may be said to have the approval of all Governments except perhaps the Punjab and that in one particular only.

3. The Chief Engineer in charge of the Thal Project is inclined to think I have not done justice to the prospects of that Project. Data are being collected. When these have been received and examined, it will be possible to reconsider the prospects. At present it seems wiser to be cautious.

4. There are three complete copies of this report : the original submitted herewith, a copy with me and a copy with the Manager of the Government Press who has promised to do the work if so directed and to proceed immediately to print. Care has been taken to give him the drawings of the maps in such form as to make immediate reproduction possible.

I have the honour to be,

Sir,

Your most obedient servant,

(Sd.) C. C. GARBETT,

Officer on Special Duty.

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CHAPTER I

INTRODUCTION

1.1. This report is concerned only with that section of the Post-war Reconstruction scheme which contemplates the distribution of land to demobilised soldiers, and the improvement of the culturable capacity of land possessed by soldiers or their kinsmen. Scope.

1.2. Its primary purpose is to recommend that the Government of India approve in principle the proposals that— Purpose.

(i) The Government of India authorise negotiation for the purchase of suitable land owned by Presidency or Provincial Governments, which is not available otherwise than by purchase.

(ii) The Government of India express their readiness to finance suitable projects for the establishment of soldier colonies, where possible by loans, where necessary by grants-in-aid.

(iii) The Government of India be prepared during the post-armistice period to utilise the organised army and its supplies on such schemes of reconstruction as require resources beyond the strength of a Presidency or Provincial Government but within the capacity of the organised army.

Its secondary purpose is to present an *ad-interim* report of the progress made in fulfilment of the Commission entrusted to me on January the 14th by the Government of India in the Defence Department, "to ascertain, first from British India and later from Indian States, the extent of land available for colonisation by demobilised soldiers, and to adumbrate schemes for colonisation". To these orders the Hon'ble Member orally added a rider that in adumbrating schemes, I should consider what steps might be possible in the directions both of the introduction of agricultural machinery and of collectivisation.

A preliminary report has become necessary because, since my visit, certain Governments are pursuing schemes some of which are greatly promising but can be brought to fruition only if help is available from the Centre. It would be idle for these Governments to incur the expense of further exploration if it were certain that the Centre would be unable to co-operate.

1.3. In Defence Department letter No. 21-Admu.43, dated the 3rd February 1943, Presidency and Provincial Governments were advised that a Commission would visit them to discuss the enquiries addressed to them in the Government of India letter No. 5702-MPA42, dated the 30th December 1942 in which they had been asked what land they anticipated could be made available. Origin of Commission.

The Hon'ble Member Defence anticipated that if no further steps were taken by the Centre, replies would generally be to the effect that no land was available. He hoped that if a Commission were to visit the various Governments, explain the nature of the Reconstruction Fund and disseminate his own tentative views as well as such information as might be gathered from the various Presidency and Provincial Governments, then some practical suggestions might emerge. He therefore directed the appointment of a Commission for this purpose.

The Commission, as originally designed, was to consist of a senior civilian and a military member. In practice, it has been found sufficient to place me on Special Duty for the purpose. Instead of having a permanent military colleague, I have had the advantage of informal discussions with the Adjutant General in India, the Q. M. G. in India, the Engineer-in-Chief, the Military Accountant General, Brigadier Covell, Director of the Anti-Malarial Institute, and Brigadier McKenzie-Taylor at Headquarters as well as General Officers in their commands. I have also to acknowledge very great assistance accorded to me by Mr. U. A. Coates, Provincial Town Planning Expert of the Punjab Government. Though there has been neither time nor opportunity to make formal reference to any of these authorities, the report which follows, to the best of my knowledge and belief, will meet with their approval. In nothing have I disregarded advice given me.

1.4. I started my touring on January the 21st and by May the 26th I had covered 7,238 miles of travelling : by rail 6,657 miles, by air 311 miles, and 270 miles by road. Area covered.

In Madras I had the misfortune to miss His Excellency the Governor then on tour, but discussed the problem with his Secretary as well as the members of his Government. I have also had full discussions with their Excellencies the Governors and the Governments of Bombay, the United Provinces, the

Punjab, and the North-West Frontier Province as well as their Highnesses of Bhopal and Rampur and their Governments. I have corresponded with H. E. the Governor of Assam and the Adviser to the Government of the Central Provinces. I have studied the latest relevant literature on China and Russia.

Summarised
results.

1.5. The anticipation of the Hon'ble Sir Firoz Khan Noon has been proved correct in every particular. The Punjab indeed had promised to set aside 78,000 acres of land. Elsewhere the experience following the end of the war 1914-1918 on the one hand, and the lack of available terrain on the other, would have resulted in a report from most, if not all, Governments that no land was available.

Now all the Governments mentioned are busy with schemes.

In the next chapter will be detailed the points on which there is general agreement. Chapters III to IX will be devoted to projects under consideration by each Government. In Chapter X financial implications are discussed. In Chapter XI the results are summarised. Then follows a series of appendices in which will be found greater detail than seems necessary in the body of the report.

It is to be understood that each Government is responsible for its own schemes. My function has been comparable to that of a bee busy with pollination, collecting suggestions, disseminating experience and tendering such advice as my consultations with high authority made possible. But at the present stage the Governments are not committed to their programmes and details of individual schemes are still fluid. Even the prospects of the *Tarai* scheme, on which much preliminary effort has been expended, are uncertain.

CHAPTER II

GENERAL AGREEMENT

Prospective
dangers.

2.1. All Governments are in general agreement in their anticipation of the dangers of the post-war period. The events of 1919, the fact that the Criminal Courts of Provinces such as the N. W. F. P., whose youth is now at the war, are comparatively idle ; and the fear lest the commando spirit, inculcated in war, may become the parent of dacoity in peace, combine to impress on those in authority the necessity for preparation against the perils of unregulated and rapid mobilisation.

The Press is full of the gallantry of the Indian soldier at the front and the prizes he is winning for the political future of the country. The soldier is being encouraged to expect reward. He goes to the front anticipating not only that there is a field marshal's baton in one pocket but the title deeds of a farm in the other. When he returns he will ask of those at home. "What have you prepared for me?"

There is general agreement that a satisfactory answer must be ready for this question. The soldier class, at least in the North, is drawn very largely from the peasantry ; and the peasantry are always reasonable. They accept that certain things are impossible. They expect that what is possible shall be done. This report explores certain of the possibilities.

Land desired but
not immediately
available.

2.2. Of all rewards none is so prized as the grant of land. Those who are landless desire to own their own home : those who have some land desire more. But the days when there were vast areas of culturable waste in British India are gone ; and the search for land is difficult. There still is a limited extent of Crown waste, the precious and last assets of the Provinces. Some Governments possess areas at present under the sway of the mosquito and the wild beast, areas which are not yet tamed to civilisation.

In the Punjab particularly, and in the United Provinces to a less degree, salt has destroyed the fertility of vast areas. In the Punjab alone it is reckoned that 25,000 acres annually are being lost to spreading salinity. There are crumbling stretches, white as with hoar frost, where once there were green fields. But the scientist has now told us that, where there is water and scientific supervision, most, if not all, can be reclaimed.

Other land, particularly in the sub-montane districts, has been lost by erosion. The trees that crown a hill are cut, it may be to provide for fuel, it may be for plough land. In the first following monsoon the rain scours a small channel, which in succeeding years rapidly works back till whole fields are swept away and a bare nullah remains. The process and its ugly results are

visible in all the sub-montane Districts, particularly Jhelum, Rawalpindi, Attock, Hazara and the North West Frontier beyond the plains. Here by series of dams, commencing at the head of a nullah, future loss can be prevented and gradually new land formed.

Finally there are schemes for improved irrigation. Mother Earth is barren unless impregnated. Where rainfall is insufficient, canals and wells can make fertile what is at present waste.

The possibilities of so creating land are present in different degrees in different Presidencies and Provinces. All are agreed that every possibility must be explored.

2.3. There is also agreement that the lessons to be drawn from the experience of grants made at the conclusion of 1914-1918 war must not be ignored. Indeed many Governments were inclined to reply to the Government of India's letter that what land had been available for distribution had been distributed in 1919 ; that that distribution had not been a success ; there was neither land nor inclination to grant it now.

Lessons from the past.

In Madras ex-soldiers were encouraged to apply for grants of waste land to be chosen by themselves. In a short time these had found their way into the hands of the *Bania*.

In Bombay, although similar grants had been made under conditions that specified that the tenure should be impartible and iralienable, nevertheless in fact these conditions were surmounted and the grants are no longer in the hands of the original grantees.

In the United Provinces Government generously brought up considerable areas for distribution to soldiers. It is calculated that only one of all these grants was successful.

In the Punjab 2,53,000 acres were distributed by the Army on an elaborate system of marks based on war services. The colonisation officer at present in charge of the Haveli Project recently noted " as a colonist the military grantee has not so far been a success, and there is no reason why he should have been. "

It follows that, while in fulfilment of pledges it will be necessary to make grants of lands to soldiers, a new system must be devised.

All Governments seem agreed in principle that this system should envisage the drawing of a distinction between reward grants and peasant grants.

2.4. There is a school of thought which holds that rewards should take the form of a lump sum payment ; or some addition to pension ; or a cash jagir for life with reduction on succession and that limited to one, or at the most two following lives. The suggestion has the merits of simplicity, equity and uniformity. It is much the easiest to work from the point of view of the State, the donor.

The reward grant

On the other hand, in the north of India at least, it is the land grant that appeals most to the recipient.

It seems certain both that some such land grants will be made and that there will not, indeed cannot, be uniformity of distribution throughout India.

But of this principle there can be uniform application *viz.* that such grants should never be made in such places or in such manner as to disturb the success of a colony village. Reward grants should be free of all colony conditions and should if possible be made in an estate in which, or near which, the grantee has his home. Escheats, small plots of *bagaiia* (*i.e.*, land remaining over from a general scheme of distribution), patches of forest or other Government land, it is to such areas rather than to new colonies that resort should be had to select the reward grantee.

There is a difference of opinion regarding the citations which should merit such rewards. H. E. the Governor of N. W. F. P. is inclined to the view that such grants should be made very very sparingly. The Punjab Government, with wider areas at its disposal, would prefer to reward all Punjabis who win a decoration in the field with an immediate grant.

In the short time at my disposal, it has been impossible to explore completely the possibility of reward grants. In Madras, when irrigation projects, now still on paper, bring fresh land under cultivation, there may be a considerable number of plots available for such distribution. In Bombay, increased irrigation facilities may possibly be similarly extended to soldiers for whom new land may not be available but for whom the advantage of

conversion from rain land to wet land may prove an adequate reward. The U. P. are searching for suitable plots.

The principle, however, stands that such grants should not be burdened with the normal conditions of a peasant grantee.

Peasant grantees.

2.5. In many parts of India, where there is abundant and well distributed rainfall, canal systems are a comparative luxury. In vast tracts of the Punjab rainfall is always insufficient, and without canal water there can be no cultivation. Here irrigation is a necessity. So it is that the Punjab has more experience of colonisation than any other Government, and this experience, spread over half a century, is still teaching its lessons and each new colony has its own conditions.

But there are certain general features. The colonist, military reasons apart, is selected from the agricultural community some times to thin an over populated district, sometimes to relieve distress caused by flooding, sometimes to substitute culturable for land that has become saline, and so forth. Always the colonist is given an area expected to suffice for at least 2 generations and not less than one rectangle of 25 acres. The colonist is responsible for jungle clearance ; and the trees and their roots become his property. He is given water free, usually for 2 harvests, and no rent or revenue is charged for the first year. At the end of a specified time, normally a year and a half, he has to construct, or have constructed, a suitable house in the area allotted to him in the village site. He is bound to transfer himself and his family within a reasonable period to this new home. A colony village usually consists of 1,000 acres only ; and though in the course of 10 years or so the total population of the village may rise to 1,000, it is obvious that in its early days the happiness of the colonists, if not their prosperity, depends largely on the mutual support they give to one another. The colonisation officer must therefore in the interests of the colony insist on fulfilment of the condition of residence. That colony can never be successful which is inhabited by rack-rented tenants.

A soldier, selected for a grant of land on a system of marks, looks on that land not as a new home but as a source of addition to his income—an addition which he means to spend in his native village. When a colonisation officer, having vainly given opportunity after opportunity to fulfil his conditions, eventually in despair confiscates the grant, the soldier immediately goes, with his brave row of medals, to all his military friends ; and letters from the O. C. of the regiment, and all Company or other officers under whom the pensioner has served, even from General Officers themselves, will descend on the head of the unfortunate colonization officer, demanding special treatment for the individual and ignoring the interests of his fellows.

In 1927, the Deputy Commissioner, Attock, a good recruiting district, was asked to select 96 peasant grantees. He restricted applications to ex-soldiers who fulfilled the conditions that

- (a) they had seen active service,
- (b) their character rolls showed that their conduct had been at least "very good",
- (c) they were not possessed of an economic holding, and
- (d) were actively employed in agriculture.

The large number of applicants was personally interviewed by the Deputy Commissioner himself and priority given to those who fulfilled all these four conditions and had the best military record. Recent enquiries have shown that though this little band of colonists were allotted land so bad that if it had been worse it would have been unculturable, and though they had thus to face exceptional difficulties, nevertheless the colonisation officer has reported them to be successful colonists.

My strong recommendation is that where new colonies, or "colonies" are to be formed this precedent be followed. I would leave it to the Army to make recommendations for reward grants and would accept these recommendations just so far as in any territory suitable land is available. But colonists should be drawn only from those who, having an adequate military record, are willing to make their home in the new colony.

The question will arise who should select such colonists. The pusillanimous civilian, anxious for relief from a series of appeals from unsuccessful applicants, would naturally prefer the military to shoulder the responsibility. But selection should be made by the colonisation officer on the advice of the military, where necessary the Officer Commanding.

* The term arose from persistent mis-spelling and passed into use as describing the new type of colony publicised for the first time in this report *vide* appendix I.

These proposals have been laid by me before the various Governments in broad principle and the tendency is to accept them.

2.6. There is general agreement that the size of the grant should be such as to permit of a general rise in the standard of living. Extent of grant.

Exactly what that connotes must differ according to the customs of the Province, the accessibility of markets and the productivity of the soil. In Madras, a *veli* or normal (not average) holding consists of 6-2|3 acres. In Balrampur, in the U. P., holdings of six acres are considered adequate. The United Provinces Government and His Highness the Nawab of Rampur are at present contemplating 20 acres as a unit. But in the Punjab a rectangle of 25 acres, a portion of which however is usually fallow and a portion at least of which is or has been liable to salinity, has become a normal minimum. The Brigadier in Bahawalpur has been asking for Bahawalpur State forces at least a rectangle and a half.

The millions of acres in the Punjab which are naturally saline cannot compare in fertility with salt free lands. Salt in the soil defeats the action of manure. Reclamation, however, is in progress and areas that have been completely reclaimed not only are free from the danger of salinity for the future but can be manured with profit and are giving a greatly increased yield—in the case of American cotton from 12 to 16 maunds; of gram in *wadhwattar from 10 to 22 maunds; of wheat from 20 to 30 maunds per acre. It follows that half a rectangle of reclaimed land should be equivalent in value to a full rectangle of un-reclaimed land, provided that there is water for the whole area.

Obviously the smaller the holding, the greater the number of soldiers for whom land can be made available. At this stage it is impossible to report more than that all Governments are agreed that grants if made at all should be substantial: the exact extent of the grant is under debate.

2.7. While some land will be available for reward grants and some for ordinary colonisation, as in the past, there is general agreement that where an expanse of land can be found sufficient to justify what is termed as 'colonisation', the scheme should be attempted. The basic theory is that the whole area should be one unit, the agricultural hinter-land supporting a market town in such a way that the rural and urban interests are identical. The villages will be planned on model lines and only those accepted for the 'Colony' who have the colony spirit. The town itself will be the property of a corporation, the majority of the shares in which will be held by the villages. There will be no danger of villages refusing to grow crops, such as cane or cotton, because of their quarrel with the capitalists in the town; nor will the managements of the factories attempt to bring undue pressure on the zamindars, waiting with their produce, as the management will be their servants. But a colony scheme can only be successful where there is a hinter-land big enough to support a town, and that means not less than 30,000, or preferably 50,000 acres. It is interesting that in the *Tarai* the minimum economic unit of area for control by an anti-malarial unit is estimated at 50,000 acres also. 'Colonies'.

2.8. Finally, there is general agreement that Presidency and Provincial Governments should receive from the Centre what assistance may be required to make land available. Centre to assist.

The principle underlying the demand of the Punjab legislature that 150 crores be set aside for this purpose commands assent throughout India.

This assistance may be as follows:—

(1) The purchase of land. By Purchase.

There is land, available for distribution, which is *de jure* encumbered.

A normal irrigation project is classified as productive, and money is borrowed from the public on the assurance that the project is comparable with a commercial undertaking. But it may be that the revenue returns will not in themselves suffice to cover the gross capital expenditure, and means may have to be sought to reduce in effect that gross sum. If a project is to produce 6 per cent. and if the necessary expenditure is X, on which the returns are only 3 per cent., then the project will be feasible only if X can be reduced by half. Canal projects contemplate some such reduction, either by direct reduction of the capital sum, or by adding to the revenue returns the interest on a capital sum raised by virtue of the project. The usual methods of raising such sums are the sale of Government land converted from 'waste' to arable by the new canal, and alternatively the imposition of a betterment fee, or a

* Moisture remaining in the soil after one crop has been harvested, sufficient to germinate a following sowing.

combination of both methods. A betterment fee is a fee charged for the privilege of having included in an irrigation scheme 'rain' or, as it is styled in some provinces, 'dry' land. Instances are the Tungabhadra project in Madras and "auction land" in the Nili Bar Colony in the Punjab.

In the Tungabhadra project in Madras, it is proposed to charge a betterment fee of Rs. 50 per acre. But, as the holdings are large, it is anticipated that many land owners will prefer to surrender to Government up to half their area, securing the benefit of irrigation without further cost for the remainder. Each acre surrendered must therefore be sold at not less than Rs. 100 to cover the betterment fee for that acre as well as for the acre in lieu of the betterment fee of which it is surrendered. But if the Provincial Government would surrender it to the Central Government at that figure, then the area would be available for distribution to soldiers. Such surrender would involve a very considerable sacrifice on the part of the Provincial Government. Dry land fetches only Rs. 50 ; canal land Rs. 500 per acre.

Similarly in the Punjab, the Nili Bar Project contemplated sale of a portion of the Crown waste, at an anticipated average rate of Rs. 250 per acre, the remaining portion to be allotted to peasant grantees. The whole of the latter portion has been allotted ; but there still remain 309,823 acres of waste assigned for auction.

Of this area, according to a recent report of the late Colonisation Officer, only 205,737 acres are good marketable land ; and to secure the financial forecast this should be sold at a minimum of Rs. 380 per acre. The Punjab expects eventually to recover from its peasant grantees, be they soldiers or others, Rs. 100 per acre.

If, therefore, the Punjab Government were to agree to sell at Rs. 380 per acre and the Government of India were prepared to buy, then an immediate outlay of Rs. 7,81,80,060 would be required ; from which eventually a sum not exceeding 2,05,73,700 would come back to the Central Government.

But neither in Madras nor in the Punjab can this land be offered by the Governments concerned free of cost. They have an inescapable obligation to the investing public to see that the projects are productive.

It may be that the Punjab Government under the temptation of the high prices now prevailing—in a recent auction the average reached was Rs. 957 per acre—may refuse to sell at the project estimate. Or the Government of India may refuse to negotiate. In the former case, should the land be not available to the returned soldier, the Government of India can reasonably claim to have made a fair offer. In the latter, the Punjab Government would be absolved of responsibility for any ill feeling in the heart of the returned soldiery.

My suggestion is that the Government of India, represented by a Revenue Officer assisted by a Financial Expert, open negotiations with those Governments who may have land in this category.

By reclamation.

(2) Reclamation of land that is unculturable by reason of jungle growth, malarious conditions, or salinity.

There are lands where man has obtained a footing and been driven back by the wild beast, the malarial mosquito, the swamp. There are others where salinity has turned good soil to crumbling dust. Such areas can be reclaimed, only in some places, most speedily in others, by organised strength such as the Army possesses.

The schemes are described in further detail in the appropriate chapters and appendices. At this stage what is advanced for acceptance is the principle that the Government of India should not hesitate in the post-armistice period to apply its military strength to schemes of reconstruction, schemes which will ultimately enure to the benefit of the soldiery themselves. Modern history teaches that all war is total war. The soldier is but the citizen serving his country in the capacity that is most effective, regard being had to the country's requirements and his qualifications. India, where less than .05 of the inhabitants are enrolled in the armed forces, is fortunate in being able to learn this lesson from contemporary text books, rather than the school of experience. But this does not detract from the accuracy of the statement. Financial handbooks may have to be rewritten : but financial rules and regulations should serve not master the State.

(3) The third proposal again is financial.

By Finance.

The immediate beneficiary of the schemes indicated in the preceding paragraph will be the Government which will derive revenue from the new cultivable area. But the financing of such schemes may exceed local capacity, and as India as a whole will benefit ; and as those who have served India as a whole will be benefited ; the proposal is that the Centre accept in principle that it is prepared to finance approved schemes by loans where possible, by grants-in-aid where necessary.

CHAPTER III.

MADRAS.

3.1. Interviews with Mr. Platts on behalf of H. E. the Governor, Sir George Boag, Sir Hugh Hood and Mr. Austin, Advisers, Mr. C. H. Masterman, Member Board of Revenue, in immediate charge of post-war demobilisation schemes, Madras, Mr. E. M. Gawne, Liaison Officer and Member Board of Revenue, Rao Bahadur Venkatakrishna Ayyar, Chief Engineer, Dr. R. Adiseshan, Director of Public Health and his staff, a G. O. C. with his Brigadiers, Major Madden R. O. and Major Greenwood, Technical R. O.

Interviews.

3.2. Preliminary reactions to the Government of India letter of December were that no land would be available, the " Grow More Food " campaign having absorbed every possible acre : and the experience of 1919 having been discouraging to further effort. " We have been busy for 20 years trying to straighten the difficulties created then," said one official. Later on, certain possibilities emerged.

First reactions.

3.3. The plans of the Tungabhadra Project are approaching completion and the C. E. enthusiastic.

Tungabhadra.

A dam is to store the waters of the river, midstream of which constitutes the boundary with the Hyderabad State. Negotiations with the State have been protracted ; but plans are ready which should bring under cultivation at once an additional 300,000 acres. The betterment fee (*vide* page 6) has been assessed at Rs. 50. The Chief Engineer anticipated that between 100,000 and 200,000 acres would become available to Government in the Bellary and Kurnool Districts by the surrender of area in lieu of betterment fees. In his view these areas would be attractive to recruits from all over Madras : as all areas were represented in those districts. He considers the Government of India could profitably purchase the land at Rs. 100 an acre, thus securing land for its soldiery : while the Madras Government would have a purchaser for ready cash and satisfactory tenants in return for the very considerable concession in price. Time and water supply would show whether new villages would be constructed : or the new grantees absorbed in existing sites. Sir George Boag however advised caution. Negotiations with the Hyderabad Government have been protracted and political difficulties are not yet solved and construction is likely to be impossible till after the war. No land will be immediately available.

3.4. A similar project is being planned for the Godavari. The betterment fee here will be Rs. 70 per acre. This area, however, is so densely populated that possibly no land will become available.

The Godavari.

3.5. The possibility of schemes parallel to the U. P. Project for the *Tarai* was discussed. The D. P. H. considers that the Wynaad area would be suitable—a view to which Brigadier Covell later assented—and that there are other vast areas, *e.g.*, Agency Tracts in Vizagapatam and East Godavari Districts, the Palni Hills and the Kauveri Delta for which similar schemes could be worked out. The Kauveri-Mettur project is expected to produce some land : but not in large compact blocks.

Jungle areas.

These possibilities are still under consideration, but the first essential is to obtain the sanction of the Government of India to schemes such as these in principle. If the Government of India will not agree to utilise its resources in these directions, then the preparation of such projects would be a waste of time and money.

3.6. The military officers consulted, appreciated the reasons underlying the proposal to distinguish ' reward ' from ' peasant ' grants but were emphatic that unless there was complete understanding of the scheme the first reactions

Propaganda.

of the army to any form of land grants would be that they were reward grants, and that dissatisfaction might be caused by the selection of peasant grantees from the class of those good soldiers, who would make good colonists, in preference to others with an equally good military record, who would not make good colonists. They therefore suggested that the sanction of the Government of India to the distinction between these two forms of grants should be obtained as soon as possible ; and then propaganda started to explain the scheme to the Army. Machinery for such propaganda exists.

The Recruiting Officer added that though, during recruitment, Recruiting Officers insisted that no land was to be expected after the war, nevertheless it was impossible to extinguish a spark of hope in the minds of recruits.

It is worth recording that, when the war is over, a considerable quantity of excellent huts at present in use by the military will be available, which could be used for the accommodation first of the troops engaged in the war on the jungle, and later of the villagers.

CHAPTER IV

BOMBAY

Interviews.

4.1. My interviews included meetings with H. E. the Governor, Messrs. Knight and Taunton, Advisers, and Mr. Jenkins, Director of Agriculture. At the invitation of the Bombay Government on 30th March 1943, I attended the meeting of the Rural Development Board at which Heads of Departments concerned and influential Bombay notables were present ; also Col. Franks, C.C.L.O. Later, in Poona, I consulted the Officiating Commissioner, Mr. McElhinny, Mr. Hammett, Superintending Engineer, Dr. Cheema, the Officiating Director of Agriculture and Col. Adlard, C.R.E., all of whom were put in touch with one another. On my return from Madras to Bombay, I had discussions with Sir Cusrow Wadia, and with Mr. Kale on behalf of the Chief Engineer, Mr. Daftary.

Assistance from centre.

4.2. If the Bombay Presidency require help in their plans for the future of returned soldiers from the Centre, this help is likely to be limited to :

- (a) assurance against victimisation,
- (b) a request for some financial assistance, possibly not greater than the allocation of funds from the Reconstruction Fund proportionate to the number recruited from the " Presidency ", and
- (c) priority in the provision and possibly the grant of machinery for public works.

Victimisation.

4.3. Certain candidates for Commissions from this Presidency appearing before the Central Interview Board, of which at that time I was Chairman, expressed the fear lest the Post-war Bombay Government would, instead of helping, positively victimise men like themselves who had come forward for war service. So much so, that they begged to be allocated to those branches of the service in which trades are taught ; so that, should they return unscathed from battle, they would be in a position to maintain themselves in complete independence of Government.

The shadow of such fear should never be permitted to take substance. Nevertheless as the shadow has existed, there is a duty to record the fact and be forearmed. The Centre in any constitution should be strong enough to secure the future of those at present under arms.

Finance.

4.4. Financially the Presidency seems to be strong. As in the U. P. their Government are setting aside a considerable portion of the windfalls due to the war for expenditure on post-war reconstruction : and some at least of this sum, already exceeding a crore, should be available for the welfare of its not very numerous returned soldiery, and the comparatively limited tracts where recruitment has been good.

It is, however, probable that applications will be received for grants-in-aid for land improvement schemes designed to help soldiers and their families.

Public Works.

4.5. Five distinct projects are occupying the attention of His Excellency the Governor and his Government, but their final decision on each has yet to be reached.

4.6. The first is the purchase of land.

Land purchase.

A Bill to give Government or a Soldiers' Settlement Board the right of preemption of such agricultural lands as may come on the market, and of settling soldiers thereon, is under consideration. It is possible that this scheme will enable a small amount of land to be made available for returned soldiers in their villages.

4.7. Next, H. E. Sir Roger Lumley called for returns of all Government land, of an extent of not less than 100 acres, in the various villages. 30,000 acres have been reported. His Excellency's suggestion was that such of these as on examination proved suitable should be distributed to groups of not less than 4 returned soldiers, who would support one another as a new unit in the life of the village.

Government plots.

Much of this area is in unhealthy tracts : and anti-malaria work may be a condition precedent. For this, help from the Centre would be required.

4.8. The Forest Officers have reported that there was no land available from forest areas. It is considered improbable that further enquiries will show that the opinion is wrong : but enquiries are being made.

Disforestation.

4.9. There are two projects each to increase the storage capacity of the two dams from which the major canals of the Presidency, the Mutha and the Nira, are fed.

Major Canals.

4.10. The improvement of the Mutha Canal, like the Bhakra project in the Punjab and the Tungabhadra project in Madras, is more difficult than that of the Nira in that it involves the co-operation of an Indian State, in this case that of the Raja of Bhore, whose consent to the inundation of a further portion of his territory has still to be negotiated.

The Mutha.

These schemes are the more attractive in that they would intensify the agriculture of the Maharashtra. The Bombay Presidency falls into four distinct areas and migration from one to the other is unlikely. But the great Mahratta recruitment districts are Satara, Poona and Ratnagiri. Though no scheme has as yet been discovered for rewarding the recruits of Ratnagiri in their homes, the hope was expressed that Mahrattas from Ratnagiri would be prepared to migrate to villages in Satara and Poona, if land could be found by the conversion of ' dry land ' into irrigated.

The land which will be brought under the command of irrigation by all these projects is practically without exception in private ownership already, and without some form of expropriation, these projects would only directly benefit such soldiers as happen to hold lands under command.

4.11. Rainfall even in commanded areas is often sufficient and the Irrigation Department have sometimes found it difficult to obtain customers for their water.

Priority of water.

To the visitor this seems strange : because an irrigated area, e.g., the lands in the immediate vicinity of Poona, presents a spectacle of prosperity in strong contrast with the adjoining un-irrigated areas. Nevertheless, the difficulty is so real that water, other than that already sold by contract, e.g., to the Sugar Estates, is distributed season by season at the will of the Irrigation Department to applicants.

When there is competition, and more applications received than water is available, it would be a practical recognition of services rendered if priority be granted to such applicants as were soldiers or were of military families.

4.12. There is a possibility of adapting for irrigation a series of small storage dams which have been constructed by the Army for military purposes, such as the provision of water supply for hospitals or military dairy farms. Nine such minor dams have already been constructed. Two others are under contemplation ; and if these are found suitable on examination, and examination is at present being made, then it may be feasible to continue the process hereafter for the improvement of agriculture. If the areas to be benefitted have provided recruits, and this point also is under investigation, then the scheme would seem to fall within the ambit of the Post-war Reconstruction scheme for soldiers.

Minor Canal projects.

4.13. The net result is that :—

Owing to the very small unoccupied cultivable area in the Presidency little land is forthcoming and the Government contemplate improving recruiting areas mainly by—

Minor other works.

(1) anti-erosion work to prevent further deterioration in the cultivable area :

- (2) contour ploughing on a very large scale to conserve available water supply and enable extension of proper dry farming methods ;
- (3) afforestation and Gradoni terracing of hillsides whether of public or private ownership ;
- (4) the encouragement of well sinking and where practicable, minor irrigation ;
- (5) extension of the road system ;
- (6) provision of educational and other amenities ;
- (7) extension of marketing facilities and the like.

CHAPTER V

BHOPAL

A large proportion of the territory ruled by His Highness the Nawab of Bhopal is forest. Many hundreds, if not thousands, of acres have been and are being disforested to provide fuel for the Prisoners of War Camp which His Highness has generously permitted to be established in the State. The roots of the felled trees have still to be cleared and much work is required to turn the dismantled forests into arable land.

When the problem of clearance has been solved, His Highness anticipates that, after satisfying the demands of his own soldiery, he could provide for upwards of 3,000 returned soldiers from British India if they care to come and settle. He is prepared to offer terms which will be attractive, and asks in return only a guarantee that his generosity shall not be abused and that colonists who have taken advantage of the initial revenue-free period shall not then run away.

Details are still to be worked out. But as the area falls within a tube-well belt, *vide* Appendix VIII, and as irrigation projects in the State are beginning to be developed, there is a very happy outlook for good cultivators.

Exactly where to find suitable tenants and exactly what formula will be most satisfying are under active investigation.

CHAPTER VI

RAMPUR.

Interviews.

6.1. In Rampur my interviews included discussion with H. H. the Nawab ; the members of his Government, individually and in conferences ; Heads of Departments concerned ; and especially with Colonel Small, Chief Commandant, who is also in charge of the Military Estate at Bhind. A day was spent in touring the countryside in company with representatives of the Rampur and of the U. P. Governments.

Colony project.

6.2. The Bilaspur tahsil of the Rampur State immediately adjoins the U. P. *Tarai* belt. As in the *Tarai*, so in this sub-*tarai* area, the malaria infecting mosquito has throughout the past two decades been driving back mankind, and considerable areas are now waste, occupied by elephant grass and jungle, where once there were habitations.

His Highness' Government had long since decided to take up the challenge as soon as the war is over and step by step to attack the jungle. When the more ambitious *Tarai* scheme of the U. P. was mooted, they expressed their willingness at once to co-operate, and the present proposal is to start a colony scheme in the State after the war. The market town to be developed will be Bilaspur, which already is the headquarters of a tahsil favourably situated as regards communications, and has some of the amenities essential to the scheme.

Numbers.

6.3. In the expanded town and the new villages the Rampur State hopes to be able to accommodate up to 3,000 *ex*-soldiers from other parts of India. The State will guarantee that the terms extended to them shall be no less, and probably more, favourable than those offered in the U. P.

6.4. It is unnecessary to deal with *Tarai* Project twice over and, as the more difficult portion of it will be in the U. P., the fuller detail will be found in that chapter. Here it is sufficient to record that the only assistance likely to be required from the Government of India is sanction to the use of organized military force in the post-armistice period for this work of reclamation.

Assistance.

If the dreams of collectivisation on a large scale in British India become embodied in substance, it will be to Rampur that the great credit of pioneering must be attributed. Their military farm already exists as a substantial experiment, and their plans for their own demobilised soldiery have been maturing at least since 1941.

CHAPTER VII

UNITED PROVINCES

7.1 I visited Lucknow and was granted an interview by His Excellency. I attended conferences convened by Mr. A. G. Shirreff, Revenue Adviser, both in Lucknow and, by the courtesy of His Highness the Nawab, at Rampur. At Lucknow the Heads and Secretaries of most departments concerned were present: at Rampur, the Special Sub-Committee of the United Provinces Government and the Hon'ble Ministers of the Rampur Government and their staffs. The conclusions reached have been embodied in a full note prepared by Mr. Russell, I.S.E., Superintendent, Govt. Estate, Bhabar and Tarai.

Consultations.

7.2. The possibilities of assistance from the Princes of India have not yet been explored through the Political Department, as it was the intention of the Hon'ble Member that proposals for British India should first take shape. This stage has now been reached, and a letter issued to the Political Secretary.

Balrampur.

But in the meantime, in addition to the initiative generously taken by Their Highnesses the Rulers of Bhopal and Rampur, enquiries have been received from the States of Sandur in Madras and Bundi in Rajputana. In addition, Maharaja Pashupati Pratap Singh, Taluqdar of the Balrampur Estate, is reserving Estate land in the Gonda district for all soldiers recruited from the Estate.

7.3. At the end of the last war, the U. P. Government purchased land that was on the market and gave it to returned soldiers. For a combination of reasons, partly because the land selected was not always suitable and partly for lack of aftercare, the results have been disappointing. Nevertheless the U. P. Government again have under consideration the purchase of land that may be available for sale, and distributing it to returned soldiers at the close of the present war.

Purchase
Contemplated.

If the suggestion matures, care will be taken to profit by the lessons of the past and maintain the distinction between reward grants and peasant grants; and, if peasant grants are given, then to provide the necessary supervision.

7.4. From the point of view of the Centre, the Rampur and the U. P. *Tarai* Schemes, if they mature, will each be a separate part of a single whole. The terrain falls under two different Governments, fortunately each working in the most harmonious relations with the other. But the problem is one and the same, *viz.*, the clearance of jungle growth and the rendering fit for human habitation a tract now under the domination of the Jungle and held by its air, water, and land forces, the mosquito and the swamp and the wild beasts of the field. Civil Government has retreated before the advancing enemy. In Rampur several villages, in the U. P. the greater part of three parganas, now are waste, where once man found a living. The official record shows that in one portion of this area alone a population of 29,556 in 1891 became reduced to 13,172 in 1941.

The Tarai Scheme

In ordinary cases of law and order, when a situation passes beyond civil control, the military are called in. Here a similar remedy is proposed to meet a similar situation, and with the greater confidence because in the current war almost identical situations have had to be faced and there are units trained to deal with the jungle and the swamp. It would seem almost criminal not to employ for the purposes of peace and construction these weapons and that organisation which, originally forged and designed for human war and destruction, will be at our disposal and can secure our end. It is a heroic task and requires heroic measures and courage.

The proposal in brief, is to win back lost territory from the germ bearing mosquito and the beasts that are four footed, and thus add to habitable healthy India one hundred square miles of new prosperity. In this area, won by military organization, will be settled colonies of ex-soldiers in model villages and model towns and the hope is that the sword turned ploughshare here will stimulate parallel progress in the contiguous country-side.

Malaria, General.

7.5. The Jungle's most dangerous weapon is the airborne mosquito ; and these proposals would not be advanced had not Brigadier Covell, in charge of the anti-malaria Institute of India, given a definite assurance that, provided his requirements are met, the mosquito, which cannot indeed be eradicated, can be controlled. These requirements are—

- (a) Never-ending anti-malaria measures.
- (b) Good communications.
- (c) Controlled irrigation and agriculture.

The scheme contemplates provision of, all these requirements. In fact, the D. P. H. in this area should be the Dictator not merely a director of Public Health.

Once the initial expenditure is met, Brigadier Covell estimates that the annual expenditure would be in the neighbourhood of 0-6-0 per head of the population only.

Specific anti-malaria measures.

7.6. Anti-malaria measures will include a mobile squad with power sprays operating in villages planned so as to be at once as accessible and as mosquito proof as possible. Accessibility will follow partly from good communications and partly from the ingenious design of Mr. Russell, I.S.E., so to concentrate the habitations of each group of four estates as to form one large village. This design (*vide* appendix V) will facilitate such conveniences as schools, post-offices, radio, dispensaries and all other instruments of progress for the provision of which a larger community is essential. At the same time it will leave intact the tribal or communal organization of the estates, each of which will literally form a quarter of the larger whole.

Supplementary measures of defence against the mosquito will be provided along the whole northern border by a belt of land to the depth of half a mile which will be disforested and then planted if practicable with the health promoting Eucalyptus and other such shrubs or trees as the Conservator of Forests may recommend for our purposes ; and also by a regulation, made the easier by Mr. Russell's *design, forbidding wet crops within one half mile of the village site.

Communications.

7.7. Good communications will be provided under the general plan of operations, (*vide* appendix VI). Final detailed planning must await a contour survey. The U. P. Government will have this survey made in the cold weather of 1943-44, provided the Government of India are prepared to see the scheme through, should preliminary detailed investigation prove satisfactory.

Controlled Agriculture.

7.8. Not only will wet crops, such as sugarcane and rice, be restricted to the outer belt of the villages, but advantage will be taken of the lessons taught by the experiments now in progress in Madras. In the paddy field intermittent have replaced continuous waterings ; and in the result not only is malaria reduced, but yields are increased.

Controlled Irrigation.

7.9. In the area to be attacked, there are numerous springfed streams which run roughly from north to south and are the outcrop of the adjacent hills. At present the streams, and the canals they feed, are choked with vegetation, and, here and there, there is tendency to swamp. But the slope is favourable to drainage and there is reason to hope that the existing swamps can be made to disappear. The scheme contemplates proper protection from flooding and necessary clearance to pass all the stream water further down the countryside to feed the more thirsty lands to the south. A detailed engineering plan cannot of course be prepared till more data are collected.

In the *Tarai*, in a year of normal rainfall, no supplementary irrigation is necessary. It is proposed therefore to provide protection against drought by the sinking of tubewells as may be necessary. The exact area to be commanded by each can again not be determined until the contour survey is complete.

Drinking water.

7.10. The surface water is bad : but the sub-soil water is excellent. Along the Kichha-Rudrapur-Barakhera Road there are artesian wells. The supply of water for domestic and drinking purposes should present no difficulty.

*See also Appendix III.

7.11. The soil is nowhere lighter than a rich loam. In places it is stiff clay. Detailed investigation into its chemical contents is being made ; but its excellence for practical purposes was impressed upon us by a Punjabi zamindar settled near the border of the two Governments. He left his home in Amritsar 18 years ago and gave to the deputation from the U. P. and Rampur Governments and myself a graphic description of the present difficulties and future possibilities of the area. He had originally settled with his family further to the north but had been driven out from his first home by the Jungle. Soil.

“ The soil, Sahib ”, he said, “ is wonderful. Look at this wheat ! Sugar-cane and rice, too, are equally profitable. But there are two things we want—freedom from fear of the encroaching Jungle, and closer attention by the administration to our needs. The terror of the Jungle it is difficult to describe. It is not only the beasts, the elephant, the tiger, the panther, the pig, the deer that destroy our crops, but the horror of the creeping swamp in the monsoon, the miasma, the stench and the sickness they bring.

We are an out-post ; and authority in the past has found it difficult effectively to reach us. An official will come in his motor-car ; mount an elephant ; ride with great izzat through the tall grass, and return. And that is all. He registers a tour completed. We do not benefit. But if you can clear the Jungle and if you will give us such attention in the future as you are giving today (the doctor was with us and had cared for the sick in the compound), then there will be far more applicants to settle than there is land. The possibilities are great. What is wanted is ‘ bandobast ’ ! ”.

It is not that the two Governments have not been alive to the situation. Indeed they can claim that settlers have been exceptionally well treated. But the difficulties are such that they require strength and organisation such as is comparatively easy for the Army, but very difficult, if not impossible, for a normal civil administration.

7.12. In such soil mechanical farming not only can be expected to pay, but has been proved to be profitable by the precedent established at the Matkhera farm in the Rampur State where sugarcane for the Raza Sugar Factory is grown. The scheme contemplates mechanical farming by an ex-mechanised army. Machinery.

7.13. The U. P. Government contemplate the provision of tractors for ploughing. There will be a battery of ploughs and rough ploughing will be done at a specified charge per acre. The further breaking up of the soil will be done by bullocks—a single tractor being able to cover 500 acres provided it is followed by teams of 12 to 20 ploughs. There will be a central workshop and servicing depot for repairs and renewals. Government to provide.

A suggestion has been made that the organisation of this machinery be similar to that of a joint stock company so that the villages, the villagers and the employees can take shares in it. Initially the whole company may have to belong to Government, but as the wealth of the farmers and the staff increases, they would be encouraged to take over from Government the ownership and supervision of the company.

7.14. Plan of an ideal colony village in an area such as the Tarai, where it will be essential to have a dry belt round the habitation, will be found at appendix III. How closely it may be possible to follow this plan must depend mainly on the configuration of the terrain. Similarly a plan for an ideal village *abadi* will be found in appendix. Here too the terrain will be among the factors determining the degree of approximation to the ideal. But in all cases it is intended that the main feature of a single village, comprising, if possible, four separate States, should be achieved. The Village.

7.15. The terms of the tenure to be offered to the returned soldiers are still being debated. Terms of Tenure.

In order that the Standard of living be raised, it is essential that the holdings be large. The area suggested is not less than 20 acres per holding. In order that there be just distribution of these acres, it may be necessary to break them up into *two holdings each of 10 acres, one within and one without the half mile limit. In order that fragmentation may be avoided, these holdings must be impartible and inalienable, except to the village community itself, and descent must be integral. Conditions of this nature are not unknown in the U. P. Details are under active consideration.

7.16. The Russian artel system if possible would be most convenient. The whole Estate would be looked on as one single farm. Each home would have its share and be responsible for a definite area. Each home would also have in Collectivisation.

*See Appendix III.

the common land an area of an acre or so in which to grow garden and vegetable crops free from all control other than normal sanitary conditions. The remainder of the crops would be grown according to a rotation decided by the committee of management of the Estate. The produce would be collected co-operatively and marketed co-operatively. Each of the four quarters of the village would be represented on the Managing Board of the village ; and each village would be represented in the town.

Financial Aspect.

7.17. In appendix VII will be found a financial statement prepared by Mr. Russell. This is not necessarily final : but it is a very useful adumbration of the financial aspect.

CHAPTER VIII.

THE PUNJAB.

Interviews.

8.1. My interviews included meetings with His Excellency the Governor ; the Hon'ble the Premier ; H. M. R. ; the Financial Commissioners ; Brigadier McKenzie Taylor, till recently Director, Irrigation Research, Punjab ; the Chief Engineers ; the Home Secretary ; Mr. Coates, the Town Planning Expert ; the Commissioner, Multan, and both his Colonisation Officers, whom I met individually in their colonies as well as in conference at Multan with the Commissioner.

Salinity.

8.2. Considerable stretches of land in the Punjab are available, or can be made available, for distribution. But all this land is by nature saline and with the application of irrigation is likely, sooner or later, to become unfertile.

Salt is one of the constituents of the soil, and when gently watered tends to move towards the surface by the force of capillary attraction. When it reaches the surface, fertility is destroyed. Over a million acres of plough land have so suffered.

When salt is present, yields never reach the highest figures obtainable elsewhere ; nor does saline soil respond as does other soil to the application of manure. But in very recent years a cure has been found and, except possibly in the Thal area, where there is an additional danger of dust-storms, all land is re-claimable, *GIVEN* the correct application of the correct quantity of water ; the correct rotation of crops ; and these under scientific supervision. Some land, as yet only a fraction of the total saline area of the Punjab, has been reclaimed. Land is reclaimed if the salts have been driven to a depth of at least 10 feet below the surface.

Given sweet water, reclamation is possible either by canal irrigation, obviously the cheapest method, or by tube-wells. The tube-wells should reclaim per cusec approximately twice the quantity reclaimed by canal irrigation in any one year. Under the " Grow more food campaign ", some 2,000 cusecs have been made available for application to saline lands on which rice and gram are being grown. These lands will have been improved *pro-tanto*.

Such land is unreclaimable which, being saline, cannot be reached by a sufficient quantity of sweet water.

I would strongly recommend that all land distributed to ex-soldiers, whether as peasant or reward grantees, should be ' reclaimed ' first, even though it appears to be first class. Fields that have borne a heavy harvest one year, can become completely barren the next. In the Dangali tract of the Lyallpur district salt spread with the speed and distress of the Black Plague. Where land is apparently good, one year of the reclamation process would normally suffice to make it permanently good and it would be wise to reclaim always.

Reward Grants.

8.3. In a pamphlet issued in 1943, by the Information Bureau of the Punjab Government, entitled " Concessions to Soldiers " it is stated that about 78,000 acres of land are to be set aside for soldiers, presumably free of cost to the Centre. How much of this will be absorbed in reward grants and how much available for peasant grants cannot be determined till the end of the war and till the number of the reward grantees is known. But it is the intention of the Punjab Government to make reward grants and it may be assumed that land will also be available for peasant grants.

Distribution of Area.

8.4. The Pamphlet indicates where this acreage is to be found : but later information has shown that the figures quoted will have to be revised. There is in fact larger area available on the Haveli Project and less on the Nilibar. On the Haveli there will be an area large enough for the establishment of a colony.

8.5. Partly under pressure of the "Grow more food campaign" and partly in the hope of finding land for disbanded soldiery, the Punjab Government is investigating every possible suggestion by which unfertile soil may be rendered fertile.

Effort to 'make' land.

8.6. The most recent venture is the Thal Project. The weir has been constructed and some two and a half crores of rupees have been spent. But the canal is still to be completed and there remains work that was estimated to cost 6½ crores. Unless priority in steel, cement and coal is given, the work must remain at a stand still.

The Thal.

The commanded area exceeds 2 million acres, of which so much is sand, so much saline, and so much alkaline that the good land immediately irrigable is estimated by Brigadier McKenzie-Taylor at a little less than 3,00,000 acres and that not of course in one block. All the rest will have to be reclaimed before cultivation is even attempted.

The Chief Engineer however hopes that there will materialise 21,289 acres of good Crown Waste and 94,377 lightly salt affected, most or all of which might be available for distribution by the fourth or fifth year after construction is resumed.

There are, however, so many uncertainties ahead, including the securing of the necessary priorities, that it would be unwise to assess this as more than a possible area.

8.7. The Jhelum district has made magnificent response to the call for recruits. It is densely populated. The Jhelum river washes its boundary; but with the exception of a 50 cusec canal, recently opened, it has no irrigation. The salt range dominates the district and the high salt content of the waters in the streams, which originate in the range, combine with the natural salt in the soil to throw land out of cultivation. Yet it is a district that deserve any help that can be given.

Irrigation of the area on the right bank of the river Jhelum from Rasul to Khushab.

The possibility of a canal to cross the numerous nullahs is being investigated. But what might be less expensive and more profitable would be a battery of individual tubewells taking water out of the river. Investigations are in progress.

8.8. There is an area roughly estimated at 60,000 acres of reclaimable salt land on the right bank of the Chenab in the area covered by the Haveli Project.

Haveli-Rangpur Right bank canal.

With a bank credit of 40 lakhs, it would be possible in the course of 5 years to reclaim the whole of this area and repay the capital spent. Floating labour would have to be imported in the first instance and in the first year there would be little or no return. But in the succeeding years there would be a return which would gradually become a profit so that by the end of 5 years the whole of the land at present worthless would be converted into good soil and the capital repaid.

8.9. On the left bank of the Chenab, there are approximately 80,000 acres of similar saline soil which, with a bank credit of 40 to 50 lakhs, could likewise be reclaimed and the capital repaid at the end of 6 years.

Chenab left bank.

It is to be understood that in both these schemes it would not be necessary to wait for the whole period of 5 and 6 years respectively before some of the land would become available for distribution. If the Punjab Government will take up these projects and later distribute the land to ex-soldiers, then it would seem well worth while of the Centre to advance the capital if required.

8.10. As explained in Chapter II, there is an area of three lakhs of acres of which 2 lakhs are good land available for purchase at Rs. 380 per acre. The Punjab Government may or may not be willing to sell at this figure. But it has already been suggested that the Government of India authorise negotiations on this basis with them. Otherwise this land will be lost to the soldiery and must be expected to pass to the highest bidder irrespective of service rendered.

Nilibar auction lands.

8.11. On the Mailsi, there are 84,000 acres of saline land in scattered blocks, the largest of which is 30,000 acres, and the remainder smaller but one as large as 16,000 acres. This tract is being surveyed by the Irrigation Department who have been good enough to include a sub-soil water survey in this preliminary investigation.

Nilibar Mailsi area

Until the results of the survey are complete, it is impossible accurately to forecast. But the Chief Engineer anticipates that if labour could be made available he could in the course of 5 years reclaim this land. In the first year

nothing could be done except for a period of 90 days to keep the land under water. The following year there might be some small and in the third a substantial rice crop.

It seems the kind of scheme for which soldiery might well be used, it being understood that when the land has been 'made', the soldiery would benefit.

More preliminary work has to be done : but the scheme is promising, provided the Centre is prepared to support it, should such support be required.

Lower Bari Doab
Colony.

8.12. As on the Mailsi, so also on the Lower Bari Doab Colony, there are scattered plots of alkaline land estimated at a total of upwards of a lakh of acres, the reclamation of which will be a lengthy process, possibly 10 years. The project is under investigation by the officiating Director of Irrigation Research and it is not possible at this stage to say more than that the prospects are not without promise.

Atari Amritsar
Tubewells Scheme.

8.13. There are 9,000 acres of salt land lying between Atari and Amritsar. If a sufficient area of this is Crown waste, it would be feasible to reclaim it by means of tubewells, so that it be made available for soldiers. The scheme is under expert investigation and seems most promising.

U. P. Punjab-
Delhi-Jamna
Scheme.

8.14. The only large area remaining in the Punjab entirely without protection from famine is the south-east where famine conditions prevailed from 1938-1942. This is the area which the Government of the Punjab proposed to protect by means of the Bhakra Dam Project, now postponed indefinitely in consequence of the recommendations of the Indus Commission, against which the Punjab Government have appealed to H. M. in Council.

Future generations will find it difficult to understand how it is that a volume of water capable of irrigating annually several million acres of land has been allowed to run waste to the sea, apparently merely to secure the continuance of an inundation system described by the Indus Commission as a "wasteful anachronism".

Balked in their attempt to develop resources within their own province the Punjab Government have now turned to the U. P. Government from whom they have met with an immediate response. As a result of a meeting in June 1943 of the Chief Engineers of both Provinces, a working agreement has been reached by which the engineers of both Provinces will proceed to frame storage and hydro-electric projects for their mutual benefit.

CHAPTER IX.

N. W. F. P.

Interviews.

9.1. Interviewed H. E. the Governor, Mr. J. H. Thompson, Revenue Commissioner, Major A. J. Dring, development Secretary, Mr. Grace, O.C. Constabulary and held a conference with Mr. Thompson, Major Dring and Mr. G. M. Brown, Chief Engineer.

Numerous Small
Schemes Envisaged.

9.2. There are only 6 districts in the N. W. F. P. ; but recruitment from them and also from the 5 Agencies is such that their reasonable claim on the Post-war Reconstruction Fund may be estimated at not less than half a crore. The interests of peace and the requirements of the Soldiers' homes alike will make it advisable to spend most of this on employment-providing schemes in the villages rather than in the erection of striking memorials.

An Officer is on Special Duty studying district by district what is required, and the requirements will be tabulated for consideration in priority of the war effort of the locality.

Area Available.

9.3. The land likely to be available for distribution, probably too small for a colony, is limited to an area of 12,000 acres on the Paharpur Canal. It consists of Government rakhs, hitherto held as a possible asset to be sold to pay for future capital works that may become necessary on the Canal. If they are made available for grants, then some financial adjustments with the Centre may become necessary.

But a Paharpur Colony would present some special difficulties. Though *kharif* supplies are good, the *rabi* is uncertain. The area is 'foreign parts' to some Pathans ; and Pathans do not easily migrate. The soil is not better than 'fair', and yield is in proportion to the labour put into it. The Pathan cultivator is not naturally as laborious as the Punjabi.

These difficulties would probably be met if grants were increased to say 30 acres per holding ; attractive *abadis* were prepared in advance ; and the colonists in any colony village were from a defined parent village or group of villages.

9.4. In the post-armistice pre-demobilisation period troops could usefully be employed in connection with the colony on—

- (a) constructing roads between the village sites ;
- (b) rakh clearance ;
- (c) preparation of the future *abadis*.

If these works could be undertaken as a field exercise, and particularly if future settlers could be among those so employed, the prospect of success of the future colony would be greatly enhanced.

9.5. Brigadier Glenny's geodetic survey shows that there is an excellent prospect for tubewells (vide appendix VIII) throughout the belt on the right bank of the Indus, between D. I. K. and Peshawar. The results of Brigadier Glenny's research had not previously been brought to the notice of the N. W. F. P. authorities ; but the possibility of tubewell development in this area is now likely to be considered. Tubewells.

9.6. There is a very large number of minor schemes the execution of which would make for the employment of disbanded men and the contentment of the soldiery e.g.— Minor Schemes.

(1) The substitution of tubewell water, for military domestic supply in Peshawar, instead of the Bara river. The Army would obtain a more secure and satisfactory source of supply, while the river water so released would increase the productivity of arable land and bring contentment to a recruiting area which has its importance.

(2) Very important anti-erosion works. To the modern administrator nothing is more pathetic than the uncared for eroded areas in the north. Considerable progress in recent years has been made in Jhelum and Rawalpindi ; and the North-West Frontier Government is prepared to profit by the example so set, particularly in the Hazara and D. I. Khan districts.

(3) Hospitals or school buildings where desired, provided always that the Province is prepared to guarantee subsequent maintenance.

(4) Minor irrigation schemes, some on private canals.

(5) Similar drainage works.

(6) Rural water supply schemes.

(7) Roads.

My general impression is that in no Province will it be so easy to expend the Reconstruction Fund exactly in conformity with its original design. But except possibly for grants in aid in connection with the Paharpur rakhs ; and from the Road Fund for roads ; and also for permission to use troops in preparing a colony or a colony, it will not be necessary to call on the Centre for assistance beyond the fair share of this martial Province in the Reconstruction Fund, and such loans as it may require for remunerative projects.

CHAPTER X

FINANCE.

10.1. A good cause may fail from poor pleading : and good pleading involves an appreciation of possible criticism, in this case the criticism of the financier and the economist. Their first reaction will be " What is the use of so little land among so many soldiers ? "

But are they so many ?

Let X represent the army on armistice day, and let it be assumed that claimants for land will be drawn only from that portion of x which has been on active service, then the maximum number for consideration may be put at $\frac{2x}{3}$.

But not all $\frac{2x}{3}$ will be demobilised. If the views of certain prominent politicians are to prevail, the army of the future will be vastly larger than the token army of the past. India, conscious of her new world status, will require an army more proportioned to her 380 millions of population within, as well as a share in the International Force of the future without, her borders. We may hazard a guess that the future army will be in the neighbourhood of $\frac{x}{2}$, and also that those who are bearing the greatest burden and heat of these passing days will be given priority of opportunity to stay on.

Of the numbers for demobilisation thus reduced, a portion at least have homes and lands of their own ; and will not come within the conditions at page 4.

Numbers to be
satisfied.

Others will be absorbed in the industries of the new industrial age. The disciplined trained soldier mechanic will, for the economic, if for no other, reason, find his way into civil factories.

Others again will find work waiting in the additional police and other services under their respective Governments.

When the remainder are divided among the Provinces, and when rules of priority of claims, based on qualifying military service as a condition precedent, and thereafter on the economic necessity of the applicant, have been framed, then the problem seems manageable and proportionate to the land available.

In the course of my touring, on one occasion I asked a very responsible body of Indians at the headquarters of one Government the question "Should a situation arise in which there would not be enough cake to go round, would Indian sentiment prefer that there be no cake; or should what little there is be given to the lucky few?" The second alternative was unanimously approved.

Soldier & Civilian
Task.

10.2. In the past one might have had to anticipate objection to soldiers doing so called civilian work: but we may assume there are no longer such blinkered bureaucrats, their eyes holden from beholding the broader boundaries of the reconstructed future. The suggested use of the army on the lines indicated in this report has received support in every Province, and in so far as that use will not involve additional expenditure, further argument seems unnecessary.

Salt and Eroded
Land.

10.3. Equally may sympathy be anticipated for the proposals to attack saline and eroded areas. The economist will be glad to hold the falling, and restore the fallen, structure. To the financier there is a good investment. Money spent will come back with interest.

Work, pay, etc.

10.4. But there will remain further items of expenditure if all the suggestions in this report are to be approved. Granted that the army has to be fed, housed and paid, whatever its employ, there will still be items not normally debitable to the Army head, such as—

Work Pay :—Work pay is that extra sum per diem to which a soldier is entitled if employed on work other than War, or training for war.

Additional Transport :—Reclamation, in certain stages at least, is likely to involve movements of battalions more frequently than would be normal in peace time.

Additional hutments :—Housing on work sites will be an expense in so far as men will be employed where there are no barracks, and existing barracks will be left empty.

There are three sources from which these sums may be found (a) Provincial, perhaps Reconstruction, Funds (b) The Central Reconstruction Fund (c) a Central grant-in-aid.

At this stage what seems to be required is an assurance that a scheme sound in itself will not be allowed to lapse for lack of financial support. The proper allocation of the burden of expenditure will vary with the circumstances of the scheme. Clearly the Centre could not be expected to find all the capital for a project which will at once give a profitable return to the Province. They might reasonably give a grant-in-aid to convert a deficit into a productive plan; and lend where a loan will suffice.

Purchase
(a) Madras.

10.5. Lastly and most difficult is the question of the purchase of land.

In Madras, if the Chief Engineer's optimism is justified, it would seem well worth while settling in a home the landless soldier returned from the front at a cost of Rs. 666. The price is small: the holding small: the value of the gesture considerable.

(b) Punjab.

In the Punjab the areas are larger and the cost greater.

If holdings were maintained at the customary standard of 25 acres, then @ 25×300 (say 380 less an ultimate average return of 80) each soldier would get a bonus of Rs. 7,500 and only some 6,500 soldiers would benefit from the purchase of all the available good land on the Nili Bar.

Conclusion.

10.6. It is for consideration whether it would not be wise to negotiate with the Punjab Government with a view to the purchase of this land on the understanding that—

(a) All land will be reclaimed by the Army before it is allotted.

(b) The allotments will be distributed in holdings, of half a square each. The bonus would then be limited to 3,750 and the numbers of colonists doubled. Thirteen thousand is not an insignificant figure.

The landless, that part of the soldiery most likely to be restless in the first years of peace, would have a holding that would be economical for one generation: and if conditions of inalienability, impartibility and integral descent could be imposed, future stability would be secured.

In some areas, too, colony towns would be possible and these would help solve the problem of younger sons. Both the Centre and the Punjab have much at stake : and the recommendation is that negotiations be opened.

CHAPTER XI

SUMMARY IN ACRES.

Province or state.	In sight.	Available by purchase.		Probable	Remarks.
		(a) Known.	(b) Possible		
Assam	Ample				Reserved for Assamese only.
Madras			1,00,000	30,000	If the Tungabhadra Scheme proves fruitful. Or more, from jungle reclamation.
Bombay	30,000				Anti-Malaria Measures required.
Bhopal	1,00,000				Clearance and conditions still to be arranged.
Rampur	30,000				Sub-Tarai Clearance.
U. P.				30,000	If Tarai Scheme matures.
Punjab	78,000	2,00,000		60,000 80,000 84,000	Rangpur } Saline. Haveli } Mailsi } Less certainly, 1,15,000 on the Thal.
N. W. F. P.	12,000				

11.2. For purchase of land, I would estimate one crore for Madras and six crores for the Punjab. I should endeavour to persuade the Punjab to accept Rs. 300 per acre and leave them to recover the peasant grantees' payment for proprietary rights.

Cost of purchase.

11.3. Cost of reclaiming land in Madras, Rampur, U. P. and the Punjab can be little more than guessed at.

Cost of reclamation.

The machinery will presumably be obtainable by book transfer. Cash disbursements cannot be estimated, but would be expected to be in lakhs rather than tens of crores.

In Appendix VII page 31, is a statement showing that the finance required for the second stage of the Tarai scheme, after reclamation is complete but including roads, might be limited to—

	Rs.
REPAYABLE	1,80,50,000
GRANT-IN-AID	21,95,000
TOTAL ..	2,02,45,000

For the combined Rangpur, Haveli and Mailsi schemes initially a bankers credit that might extend to $1\frac{1}{2}$ crores for all three schemes, would seem required. This money would all be repaid.

In short, the establishment of a Colony Town would require the provision of a few crores, the greater part repayable.

Orders required.

11.4. Orders are required on the three proposals detailed at 1.2 (Page 1).

In addition the following adumbrations are for consideration :—

(a) The proposal to distinguish reward from peasant grants (2.4 and 2.5, pages 3 and 4).

(b) The colony scheme (Appendix I).

(c) Appointment of a small commission to negotiate with the Punjab Government [2.8 (1), page 5].

(d) That all land in the Punjab made available through the assistance of the Centre be reclaimed before distribution. (8.2, page 14.)

(e) That such reclaimed land, provided water is available, be distributed in allotments limited to $\frac{1}{2}$ a square *viz.*, $12\frac{1}{2}$ acres.

APPENDIX I

COLONY

A colony is an administrative unit containing a market town and a hinterland to support it, so constituted as to provide employment, in model villages and a model town, for a demobilised modern mechanised army. This new form of colony is designed to obviate urban and rural rivalry : to mitigate communal antipathy : to promote the co-operative spirit and to secure for the future the temporary higher standards of living attained in the period of war.

It is possible where 30,000 acres or more can be controlled. The detailed design must differ with differing terrain, but the broad principles of the ideal are constant. In an ideal lay out there will be roads connecting all villages one with another : and with the town. The town will be on or near good main communications, if possible, a railway. To facilitate the maintenance of good and cheap roads, only rubber tyred traffic and wheels with ball bearings will be allowed.

Four Estates will combine to make one village : each Estate retaining its individual, perhaps communal, characteristic : but all being combined for such purposes as schools, hospital, post office, banking, shopping, etc., wherein greater numbers increase efficiency. This will be effected by siting the dwelling of each of the four contiguous estates at adjacent corners.

The villagers will be hand picked : ex-soldiers of good character returning to the plough and coming from homes where their own holding is too small to be economical.

Their individual property will vary in extent and in nature according to the custom, tradition and law of their Presidency or Province. But the ideal would be a holding of a specified share in the estate to descend integrally, to be impartible, and inalienable except to the body of shareholders.

Where there is no Alienation of Land Act it may be wise that the grantees remain crown tenants. Where there is community farming, there will be individual allotments of an acre per house for vegetables and gardens : and where there is individual farming, there will be a community garden or orchard plot of 20 or 25 acres, to be worked co-operatively.

Where possible a village will be allotted to a regiment, the different estates being managed by the different communities comprising the regiment.

Holdings will be large enough to provide some surplus : insurance will be encouraged for the marriage portion of daughters and the education of sons.

In the town, priority of employment will go to the sons of the town and the villages.

The town will belong to a corporation. Shares in the corporation will be distributed as to 60 per cent. to the villages : so that the villages will have a direct interest in the co-operative industries. Cotton will be grown to be sent to the ginning, and cane to the sugar, factories. The farmer will not starve the factories, nor the factory management the farmer. Their interests will be one.

Vacant sites will be the property of the corporation or the village. Unearned increment will accrue to the body politic.

There will be Co-operative Companies for building, electricity, water works, marketing, banking, transport and their ancillaries : and industries, such as sugar, cotton, rice straw-boards, and so forth which with their offices will employ disbanded Sappers, Ordnance personnel and the best of the clerical staff.

Initial finance will be lent by Government : but as prosperity increases, Government loans will be repaid by the villages and the corporation will become a self-governing unit. Legislation may be necessary.

APPENDIX II

TOWN PLAN (SEE MAP ATTACHED)

EXPLANATION OF TOWN PLAN

1. The town is designed to serve the population of at least 8 Model Villages (32 estates) and to market for export not only the surplus agricultural produce, but also goods prepared in factories designed to utilize agricultural products, e.g., cotton yarn and possibly cloth ; carded wool ; ghee ; buttons and combs made from bones, nuts, coconut shells ; manufactured articles prepared from the waste products of milk ; preserved and bottled fruits and chutnies, jams and marmalade and so forth.

2. The town should accommodate a population of about 12,000, say, 2,000 families, and is so designed as to be easily extended.

3. Important features are the insulation of civil buildings, the business centre and general residential quarters, from the noise and dust of the industrial zone.

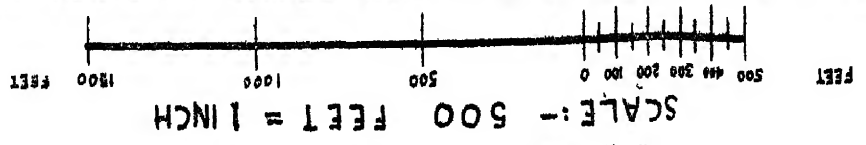
Similarly, the different categories of town uses, such as administration, business and housing are separated. Industrial labour is housed reasonably near to its place of work, but yet is close to the green belt and separated from the industrial zone by open spaces.

4. The orientation of a plan of this nature, would take into account the direction of prevailing wind, the industrial zone being so sited as to obviate, as far as possible, dust and smoke being blown into the residential area.

5. The backbone of the town consists of an elongated octagon with roads 100 ft. wide. These link up with the through-roads from outside the town. The octagonal 100 ft. road provides a ring road conveying directly to the different parts of the town. The main shopping centre is not on the main road in front of the railway station, where it would cause congestion, but is sited on a parallel road in the hinterland.

6. The allocation of land in the town plan is as follows :—

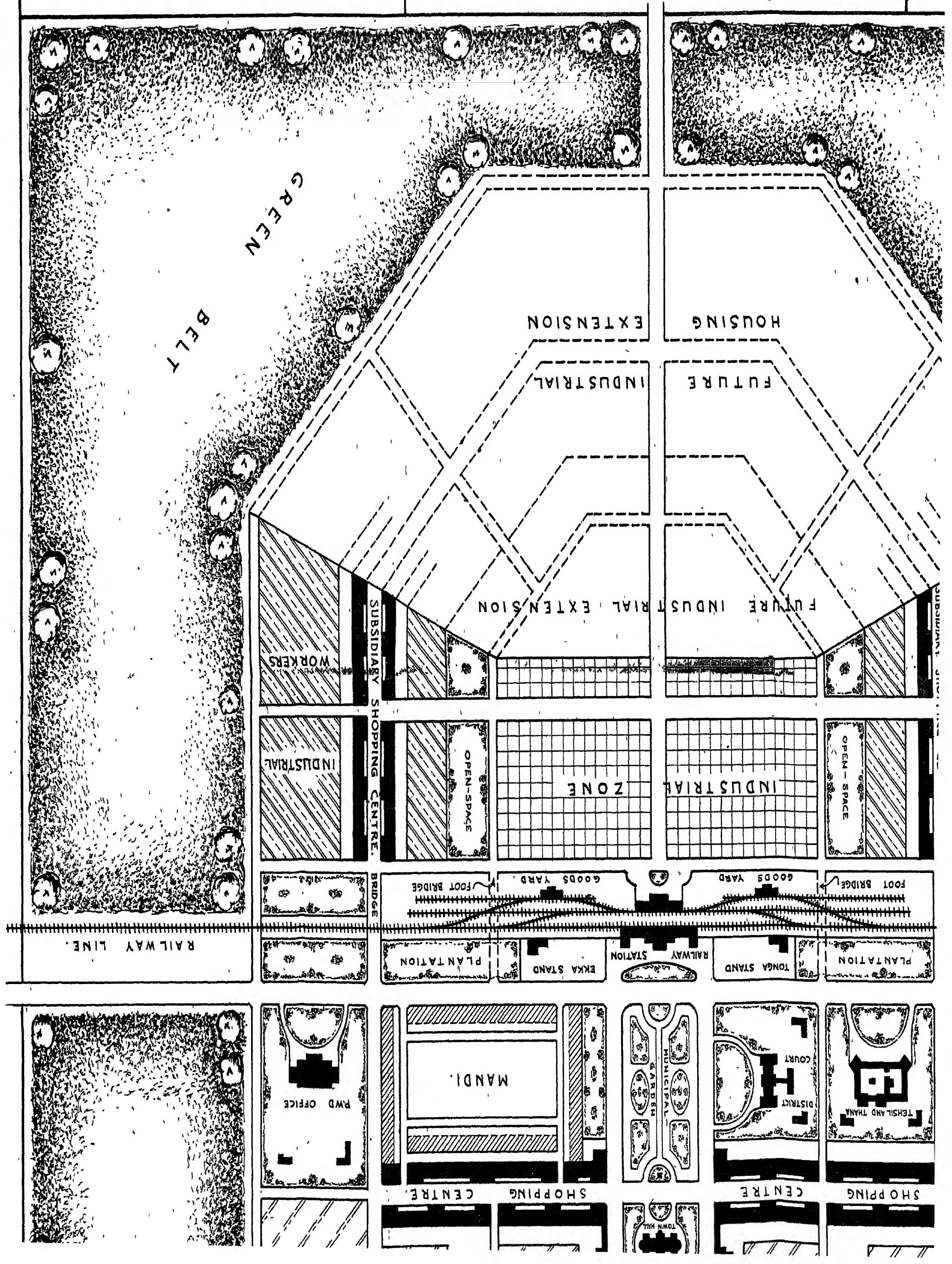
	Acres.
(1) Roads	119
(2) General Abadi	188
(3) (a) Open space	63
(b) Green belt	883
(4) Civil Lines	129
(5) Industrial zone	
(space for extension—64)	38
(6) Industrial workers	
(space for extension—128)	38
(7) District Jail	13.5
(8) Tehsil and Thana	11.5
(9) District Courts	11.5
(10) Municipal Gardens (including Town Hall)	16
(11) Mandi area	26
(12) P. W. D. Offices	13.5
(13) Station Yard	21
Total	1,566
Deducting green belt	883
Area of Town	683



A SUGGESTED PLAN OF THE TOWN

REFERENCES:-

- 3. INDUSTRIAL ZONE SHOWN THUS.
- 4. INDUSTRIAL WORKERS



APPENDIX III

VILLAGE LAYOUT (SEE MAP ATTACHED)

EXPLANATION OF VILLAGE LAYOUT

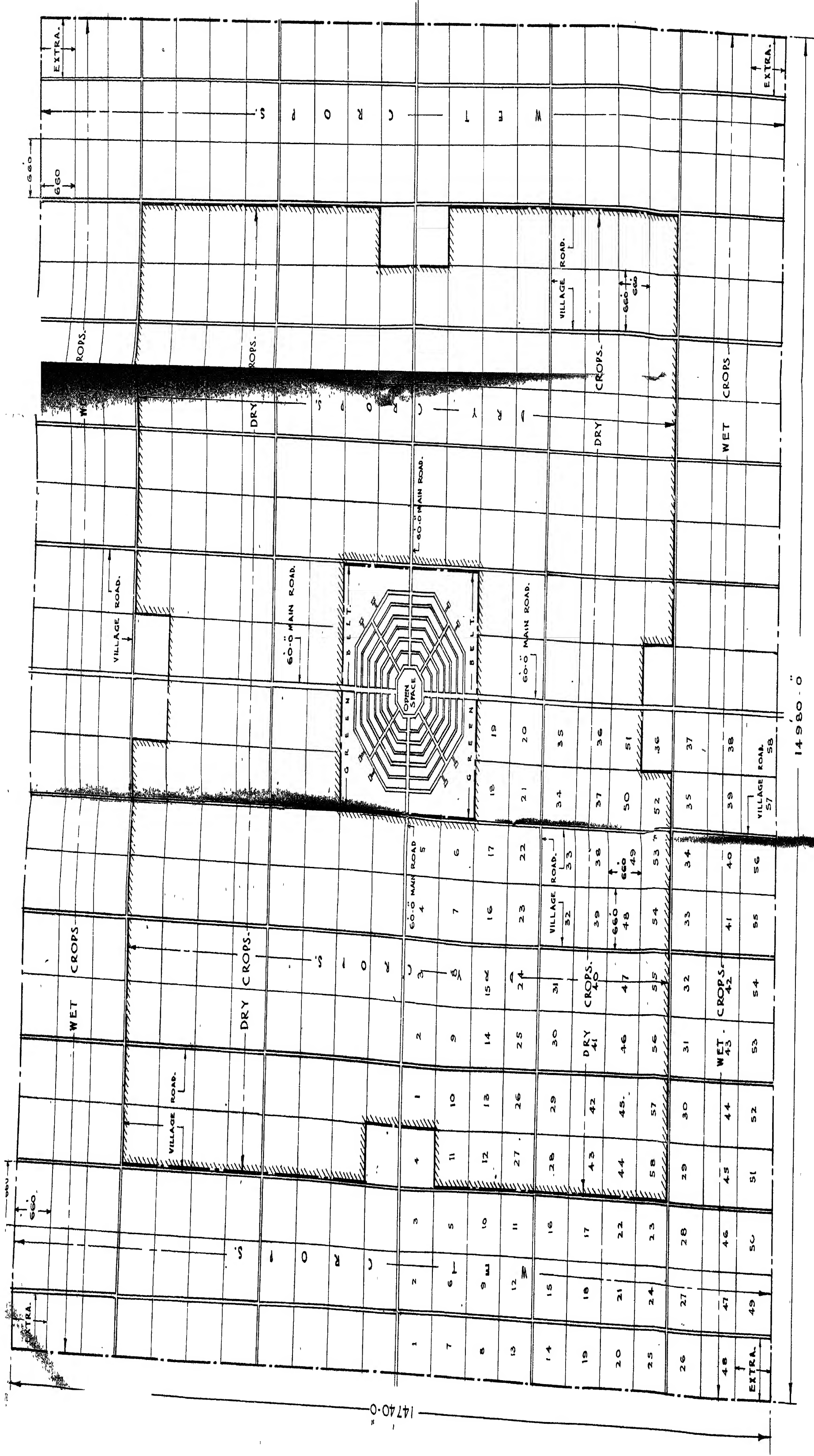
1. The plan of a Model village lay out as also that of a model town and a model abadi has been prepared by Mr. U. A. Coates, Provincial Town Planner, Punjab, after several consultations. It is intended as a basis for study and an ideal to be approached according to the suitability of any particular site. On undulating terrain it might require considerable modification.

2. The allocation of land in the lay out is :				Acres.
(a)	Land cultivated with wet crops	..	..	2,360
(b)	Land cultivated with dry crops	..	..	2,320
(c)	Village including parks, open spaces, fruit growing, market gardens, shops, public buildings and abadi	..	..	167
(d)	Agricultural roads	..	..	250
				<hr/> 5,097 <hr/>

Eight such village units and one town could be accommodated on about 42,000 acres of land.

3. This layout has been prepared with a view to conditions such as those which prevail in the *Tarai*. That is why there is a wet belt and a dry belt, and why each holding of 20 acres is sub-divided into 2 holdings of 10 acres : one holding in the dry and one in the wet belt. This separation would not be necessary in an ordinary estate in the plains.

4. The dwelling houses are sited in the contiguous corners of the estates, so that 4 estates form one village. This is essential in the *Tarai*, to facilitate protection from the mosquito. Elsewhere also it would be of advantage.



TOTAL AREA COVERED = 5097 ACRES.

LAY OUT PLAN OF VILLAGE UNIT INCLUDING CULTIVATED LAND

SCALE, 1000 = 1"



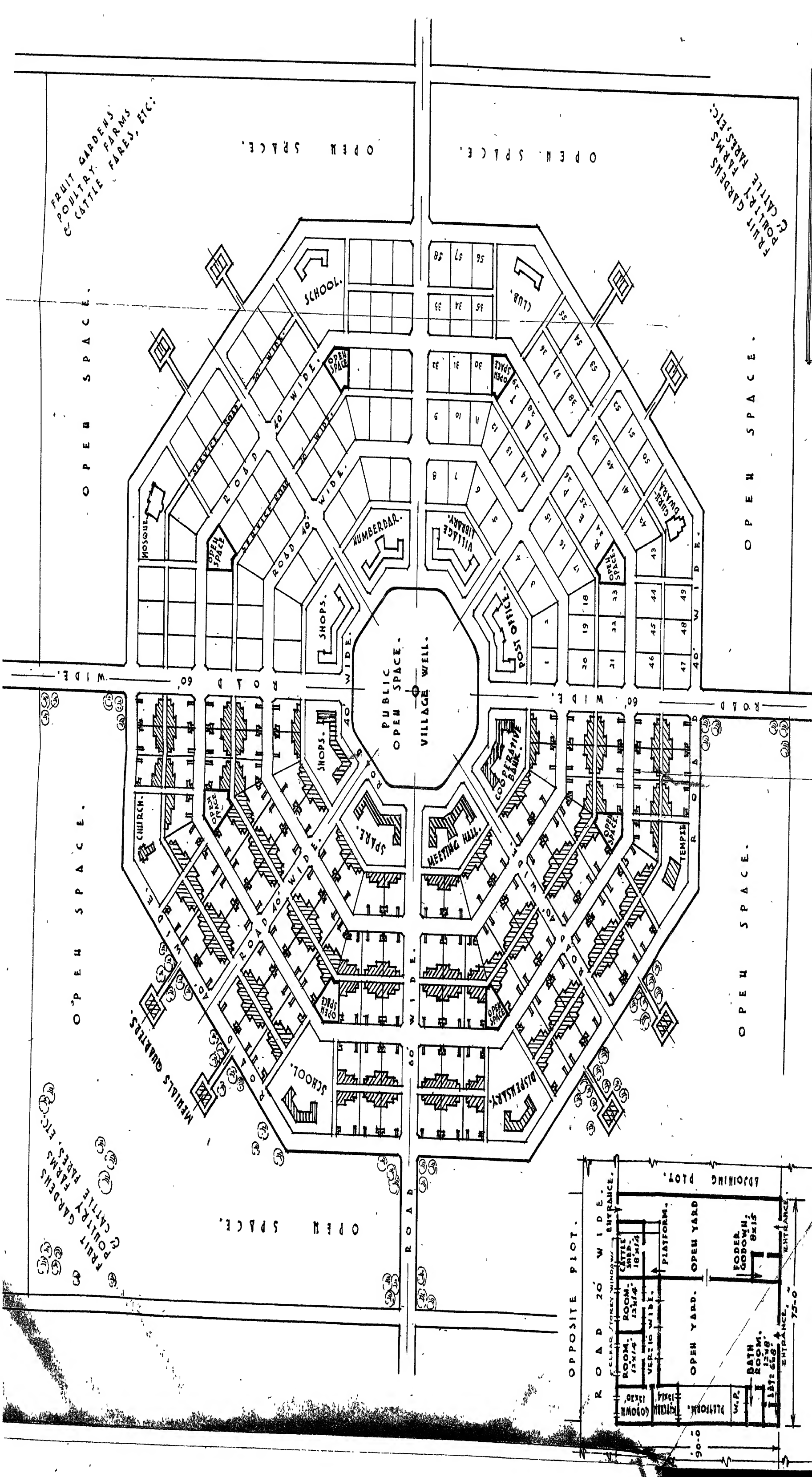
APPENDIX IV
ABADI (SEE MAP ATTACHED)
EXPLANATION OF ABADI

1. In an *abadi* on this scale there will be 232 houses and the population may be expected to reach about 1,600. Each house is designed to occupy $1\frac{1}{6}$ th of an acre, and a diagrammatic plan is added, suggesting a typical utilization of the plot. Certainly and preferably always, each house should have anti-damp courses.

2. The plan contemplates the housing of menials outside the main *abadi*. It is recognized that in some Provinces it is preferable to have them outside and in others inside.

3. The plan gives to the *abadi* $1\frac{1}{4}$ th of a square mile and provides an open area immediately surrounding the houses for pasture of cattle, manure pits, fruit growing, market gardening and recreation.

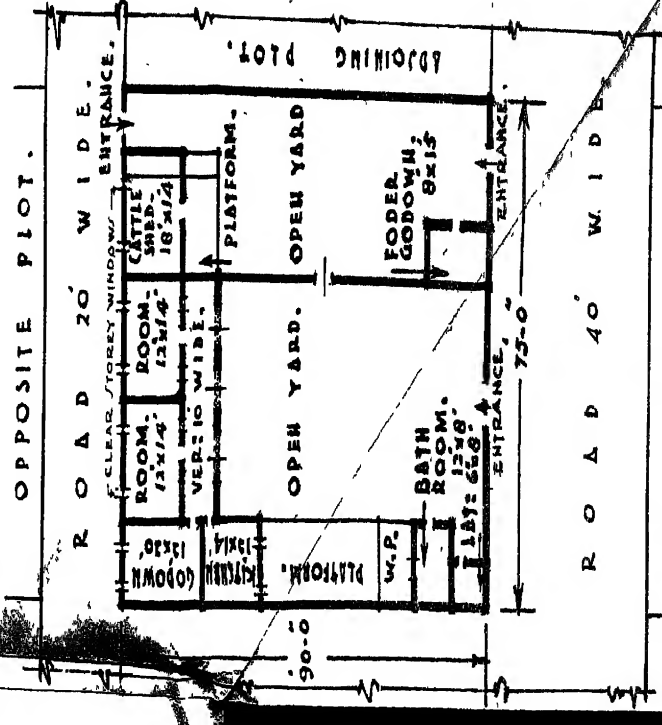
4. The size of each estate is approximately 2 square miles. No farmer would have to walk more than $2\frac{1}{2}$ miles to his farthest field, while the average would be very much less.



THE VILLAGE LAY OUT

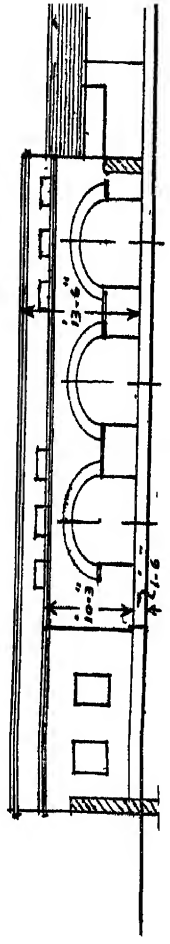
PLAN OF VILLAGE HOUSE.

SCALE, 30"=1"

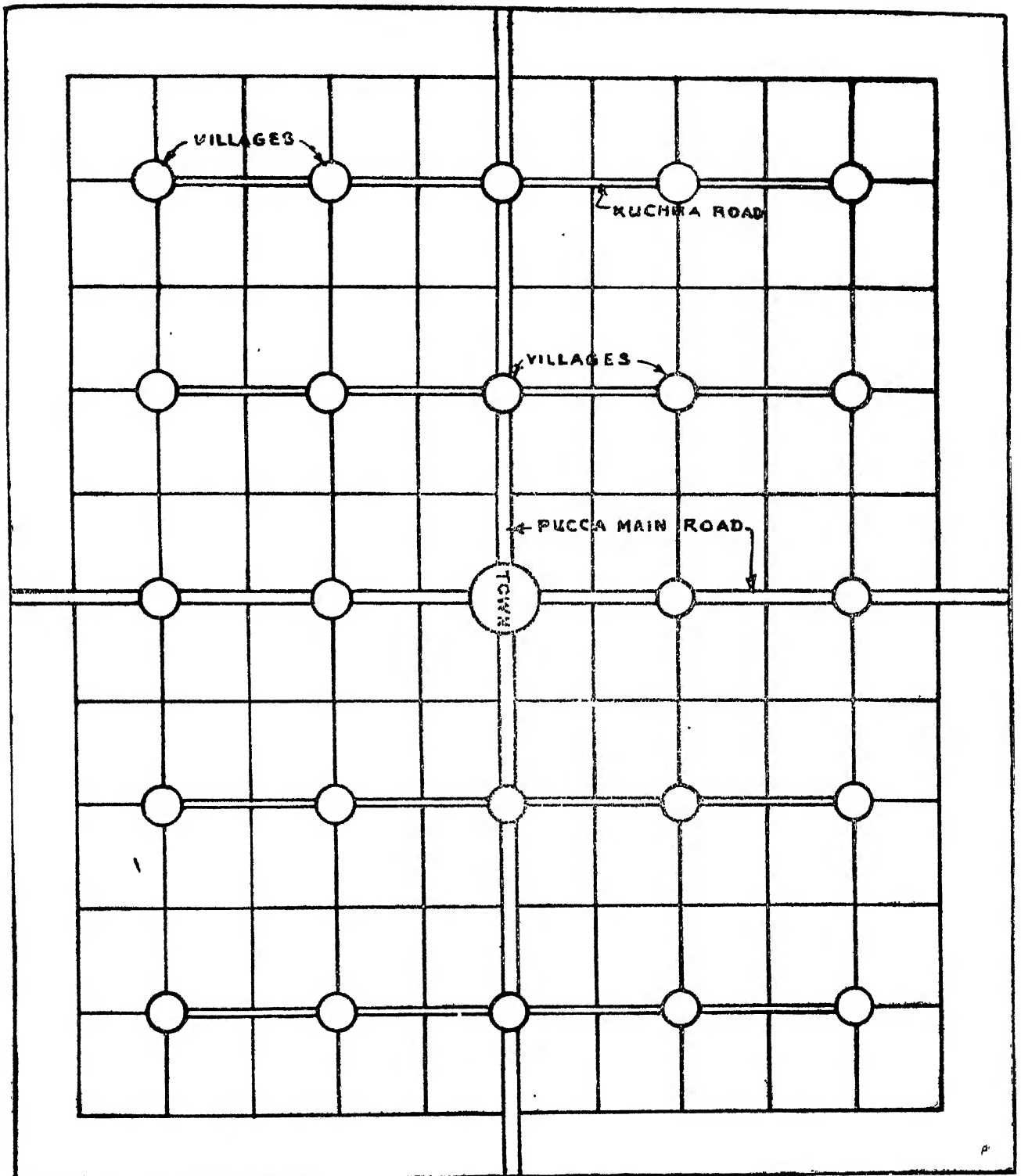


ELEVATION OF VILLAGE HOUSE.

SCALE, 15"=1"



APPENDIX V
SKETCH PLAN OF A COLONY



APPENDIX VI

DRAFT PLAN OF OPERATIONS TO REDUCE 50,000 ACRES OF *TAKAI* JUNGLE
TO HABITABLE COUNTRYSIDE

Caution.

1. Due to the absence of detailed information of the exact areas in which such schemes are envisaged, it is impossible to give anything like firm figures for the various engineering works which have to be undertaken. The figures that follow are nevertheless a rough guide to the order and extent of resources required ; and will be adjusted according to conditions which appertain to the site chosen.

Assumptions.

2. It is assumed that—

(a) the jungle is of average density, *viz.*, long grass interspersed with lightly wooded areas and only a small percentage thickly forested with large trees.

(b) 20 miles main roads and 80 miles secondary roads will be required. For the main roads a 12'—0" wide all weather crust has been allowed whilst for secondary roads 9—0 all weather surface has been taken. In each case the formation width allows for widening if considered necessary at a later date.

(c) Under the heading "drainage", allowance is to be made for anti-malarial measures and a certain amount of earthwork.

For the basis of computation 50 miles of main drains and 200 miles of secondary drains have been assumed.

(d) Huts will be constructed of local materials and of local type.

Programme.

3. *Programme of work.*

Year I.—During the first year it is essential to complete—

The whole of the main roads,

50 per cent. of the secondary roads,

and at least 50 per cent. of jungle clearance.

Drainage works would proceed simultaneously.

Year II.—By the end of the second year—

The whole road programme should be complete,

All the main drainage finished, and

Jungle cleared over the whole area.

Year III.—The third year should see the completion of rough levelling of plots, the completion of secondary drainage, the erection of fencing, the construction of wells, and the construction of the permanent hutting.

4. *Resources Required for one unit.*

(i) *Labour.*

<i>First Year</i>	..	..	Jungle clearance	..	..	..	..	..	5,000
			Road Works	..	..	..	..	..	2,000
			Drainage and Anti-Malarial Works	..	..	..	..	..	2,000
			Machine Operators						1,000
			Labour for Temporary Hutting etc.						
									10,000
<i>Second Year</i>	..	..	..	..	..	..	..	..	10,000
<i>Third Year</i>	..	..	..	..	..	..	..	..	5,000

(ii) *Plant.*

Angle Dozers	..	..	..	..	..	9 No.
Blade Graders	..	..	..	..	..	3 No.
Scrapers	..	..	..	..	..	1 No.
Tractors	..	..	..	..	..	10 No.
Ditchers	..	..	..	..	..	6 No.
Sheeps Foot Rollers	..	..	..	..	..	4 No.
Dumpers	..	..	..	..	..	20 No.
Stone Crushers	..	..	..	..	..	10 No.
Road Rollers	..	..	..	..	..	10 No.
Tar Boilers	..	..	..	..	..	10 No.

(iii) *Lorries (3 ton).*

Year	(i)	..	..	..	..	150 No.
	(ii)	..	..	..	..	150 No.
	(iii)	..	..	..	..	75 No.

(iv) *Principal Stores.*

Bitumen	..	..	..	..	..	2,000 tons.
Cement	..	..	..	..	..	6,000 "

APPENDIX VII

STATEMENT OF COSTS

Item Serial No.	Particulars.	Non-recurring expenditure.				Recurring Expendi- ture.	Remarks and explana- tions.
		Details.		Amounts.			
(1) Non-repayable.							
1	Roads (Main)	10 miles	@	30,000	3,00,000	3,000	This is for metalling the two main roads. They will be main- tained by the Estates.
2	Roads (Branch)	25 miles	@	8,000	2,00,000	2,000	This is for making the earth roads connecting villages. They will be maintained by the Estates.
3	Irrigation Tube-wells with water courses.	80	@	6,000	4,80,000	1,000	Recurring and running expenses will be borne by the farms themselves.
4	Drinking Tube-wells ..	50	@	3,000	1,50,000	500	The wells themselves will be constructed and maintained by the Estates.
5	Improvement of irrigation works.	100 miles	@	1,000	1,00,000	7,500	These will have to be constructed and maintained by the Estates.
6	Drainage works	80 miles	@	2,500	2,00,000	4,000	To be constructed and main- tained by the Estates.
7	Anti-malaria measures ..	L.S.			1,50,000	10,000	Ditto.
8	Village roads, drains, etc.	12	@	5,000	60,000	..	After construction by the Estates they will be maintained by the village organizations.
9	Town Roads	6 miles	@	20,000	1,20,000	..	After construction they will be maintained by the town council.
10	Town drains & sanitation ..	20 miles	@	5,000	1,00,000	..	Ditto.
11	Hospital & Dispensary with equipment and quarters for staff.	L.S.			1,00,000	15,000	To be constructed and main- tained by the Estates includ- ing salary of staff.
12	Veterinary Hospital with equipment and quarters for staff.	L.S.			15,000	3,000	Ditto.
13	Estates offices and staffs' quarters.	..	..		1,00,000	12,000	Ditto.
14	Fencing	30 miles	@	4,000	1,20,000	500	These will have to be constructed and maintained by the Es- tates.
Total ..				Rs.	21,95,000	58,500	
(2) Repayable.							
1	Village housing	12 x 250	@	1,500	45,00,000	..	This is for providing pucca dwellings. The expenditure will be incurred from a Gov- ernment loan and recovered in easy instalments on the hire purchase principles. Main- tenance will be done by the occupants under their own committees' directions.
2	Town housing	3,000	@	1,500	45 00,000	.	
3	Industries	L.S.			60,00,000	..	This sum is expected to cover the initial industries only. Further sums will be required for development of other in- dustries in course of time. Maintenance and management will be borne by the concerns themselves.
4	Tractors and implements	60	@	30,000	18,00,000	..	This is the initial cost only. Running expenses and rene- wals will be met from the charges made for the work done.
5	Dairy cattle & machinery ..	1,000	@	250	2,50,000	..	Funds will have to be provided at the outset to enable the set- tlers to purchase the live stock and implements required to start work with. Recoveries could be made in easy instal- ments.
6	Bullocks and ploughs & carts for tenants.	2,500	@	400	10,00,000	..	
Total				Rs.	1,80,50,000	..	

(Sd.) J. W. RUSSELL,

I.S.E.,

Superintendent, Tarai and Bhabar,

Government Estates, Naini Tal.

APPENDIX VIII**GEODETTIC SURVEY (SEE MAP ATTACHED)****EXPLANATION OF GEODETTIC SURVEY**

The force of gravity at the earth's surface varies from place to place according to the type of rock at or immediately below the surface. If the rock is an igneous rock, it will have little or no pore space and the density will be high. In such an area, gravity will be above normal. If the rock is alluvium, there will be a fairly large pore space and consequently the density will be low. In such a case gravity will also be low. The determination of gravity in an area will indicate whether the underlying rock is likely to have a high or low pore space. Since large sub-soil water-supplies can only occur in soils of large pore space, the determination of gravity will indicate areas in which soils of the necessary type occur.

The Survey Department, Government of India, have carried out a gravity survey and the general gravity conditions are given on the map. The red lines indicate rocks of maximum density and minimum pore space ; the blue lines indicate rocks of minimum density and maximum pore space. From this it follows that it is only in areas adjacent to the blue lines that tubewells are likely to be successful. The areas can be more specifically defined by a study of the gravity values in the areas indicated by the blue lines.

INDIA CRUSTAL STRUCTURE LINES

